

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Amendment) A spin valve sensor comprising:
 - 2 a first pinned layer having a first width and a first magnetic orientation;
 - 3 a free layer having a second width disposed above the first pinned layer; and
 - 4 a bias layer having the second width disposed above the free layer and a second magnetic orientation orthogonal to the first magnetic orientation, wherein the second width is
 - 5 smaller than the first width;
 - 7 a second pinned layer having a third magnetic orientation anti-parallel to the first
 - 8 magnetic orientation; and
 - 9 a coupling layer disposed between the first and second pinned layers;
 - 10 wherein a thickness of the first pinned layer is substantially equal to a thickness of the
 - 11 second pinned layer.

- 1 2-3. (Canceled)

- 1 4. (Amendment) The spin valve sensor according to Claim [[3]] 1, further
- 2 comprising an anti-ferromagnetic (AFM) layer disposed adjacent to the first pinned layer.

- 1 5. (Original) The spin valve sensor according to Claim 4, wherein a
- 2 thickness of the AFM layer establishes exchange coupling between the AFM layer and the
- 3 first pinned layer.

1 6. (Original) The spin valve sensor according to Claim 4, wherein the first
2 and second pinned layers are self-pinned.

1 7. (Amendment) A magnetic storage system, comprising:
2 a magnetic recording medium;
3 a spin valve sensor disposed proximate to the recording medium, the spin valve
4 sensor, including:

5 a first pinned layer having a first width and a first magnetic orientation;
6 a free layer having a second width disposed above the first pinned layer; and
7 a biasing layer having the second width disposed above the free layer and a
8 second magnetic orientation orthogonal to the first magnetic orientation, wherein the second
9 width is smaller than the first width;

10 a second pinned layer having a third magnetic orientation anti-parallel to the
11 first magnetic orientation; and

12 a coupling layer disposed between the first and second pinned layers;
13 wherein a thickness of the first pinned layer is substantially equal to a
14 thickness of the second pinned layer.

1 8-9. (Canceled)

1 10. (Amendment) The magnetic storage system according to Claim [[9]] 7,
2 further comprising an anti-ferromagnetic (AFM) layer disposed adjacent to the first pinned
3 layer.

1 11. (Original) The magnetic storage system according to Claim 10, wherein a
2 thickness of the AFM layer establishes exchange coupling between the AFM layer and the
3 first pinned layer.

1 12. (Original) The magnetic storage system according to Claim 10, wherein
2 the first and second pinned layers are self-pinned.